

Appln No. 10/724,957
Amdt date June 30, 2008
Reply to Office action of March 31, 2008

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1. (Currently Amended) A port acceleration apparatus for a fibre channel arbitrated loop, the fibre channel arbitrated loop coupling a plurality of disks, the apparatus comprising:

at least one fibre channel input configured to receive data from the fibre channel arbitrated loop;

at least one fibre channel output configured to send data to the fibre channel arbitrated loop;

at least one device input configured to receive data from at least one of the disks;

at least one device output configured to send data to the at least one of the disks;

at least one controller configured to process at least one fibre channel primitive ~~flowing in received on the at least one fibre channel arbitrated loop input~~ to generate, based on the at least one fibre channel primitive, ~~at least one signal~~ a plurality of states comprising an indicative indication of what is routed whether data from the at least one fibre channel input is to be routed to the at least one fibre channel output or and what is routed to the at least one device output; and

~~at least one a first multiplexer configured to route, in accordance with the plurality of states at least one signal, data from the at least one fibre channel input or a current fill word the data received by the at least one fibre channel input to the at least one fibre channel output or to the at least one device output; and~~

a second multiplexer configured to route, in accordance with the plurality of states, data from the at least one fibre channel input, data from the at least one device input, or data from an arbitration generator to the at least one fibre channel output.

Claim 2. (Original) The apparatus of claim 1 wherein the at least one fibre channel primitive includes at least one of an ARB primitive and an OPN primitive.

Claim 3. (Cancelled)

Claim 4. (Cancelled)

Claim 5. (Cancelled)

Claim 6. (Cancelled)

Claim 7. (Original) The apparatus of claim 1 wherein the apparatus comprises an integrated circuit.

Claim 8. (Cancelled)

Claim 9. (Currently Amended) A method for accelerating traffic flow in a fibre channel arbitrated loop that connects a plurality of devices including at least one disk, the method comprising:

receiving, from the fibre channel arbitrated loop, data comprising at least one fibre channel primitive;

receiving, from the at least one disk, data comprising at least one fibre channel primitive;
processing the at least one fibre channel primitives to determine a plurality of states indicative of whether to route data received from the fibre channel arbitrated loop to the at least one disk or to the fibre channel arbitrated loop; ~~and~~

routing, in accordance with the state determination, the data received from the fibre channel arbitrated loop;

routing, in accordance with the state determination, the data received from the at least one disk;

routing, in accordance with the state determination, a current fill word to the at least one disk; and

routing, in accordance with the state determination, data from an arbitration generator to the fibre channel arbitrated loop.

Claim 10. (Original) The method of claim 9 wherein the at least one fibre channel primitive includes at least one of an ARB primitive and an OPN primitive.

Claim 11. (Currently Amended) The method of claim 9 further comprising routing, in accordance with the state determination, data received from the at least one ~~of the devices~~ disk to the fibre channel arbitrated loop.

Claim 12. (Cancelled)

Claim 13. (Cancelled)

Claim 14. (Currently Amended) The method of claim [[13]]9 further comprising routing to the at least one disk, in accordance with the determination, data received from the fibre channel arbitrated loop or at least one CFW primitive.

Claim 15. (Currently Amended) A data routing apparatus for at least one disk device associated with a data loop, the apparatus comprising:

- at least one data loop input configured to receive data from the data loop;
- at least one data loop output configured to send data to the data loop;
- at least one controller configured to process at least a portion of the data received by the at least one data loop input to generate at least one signal indicative of at least one source of data to be routed to the at least one data loop output; and
- at least one multiplexer configured to route data ~~received by the at least one data loop input~~ to the at least one data loop output ~~or the at least one disk device~~, in accordance with the at least one signal, directly from the at least one data loop input or from the at least on disk device.

Claim 16. (Previously Presented) The apparatus of claim 15 wherein the processing comprises determining whether the at least one disk device is authorized to participate in a conversation currently associated with the data loop.

Claim 17. (Previously Presented) The apparatus of claim 15 wherein the processing comprises determining whether the at least one disk device has successfully arbitrated to gain access to the data loop or is communicating with at least one other device that has successfully arbitrated to gain access to the data loop.

Appln No. 10/724,957
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Claim 18. (Previously Presented) The apparatus of claim 15 further comprising at least one device input configured to receive data from the at least one disk device.

Claim 19. (Cancelled)

Claim 20. (Cancelled)

Claim 21. (Previously Presented) The apparatus of claim 15 further comprising at least one device output configured to send data to the at least one disk device.

Claim 22. (Cancelled)

Claim 23. (Cancelled)

Claim 24. (Original) The apparatus of claim 15 wherein the apparatus comprises an integrated circuit.

Claim 25. (Original) The apparatus of claim 15 wherein the apparatus comprises a hub.

Claim 26. (Cancelled)

Claim 27. (Currently Amended) The method of claim ~~26~~9 wherein the processing comprises determining whether the at least one device is authorized to participate in a conversation currently associated with the data loop.

Claim 28. (Currently Amended) The method of claim ~~26~~9 wherein the processing comprises determining whether the at least one device has successfully arbitrated to gain access to the data loop or is communicating with another device that has successfully arbitrated to gain access to the data loop.

Claim 29. (Currently Amended) The method of claim 26-9 further comprising routing, in accordance with the state determination~~at least one signal~~, data from the at least one ~~device~~ disk to the fibre channel arbitrated data-loop.

Claim 30. (Cancelled)

Claim 31. (Cancelled)

Claim 32. (Currently Amended) The method of claim [[31]]9 further comprising the step of routing to the at least one device, in accordance with the state determination~~at least one signal~~, data from the fibre channel arbitrated data-loop or other data.

Claim 33. (Currently Amended) An apparatus that communicates via a data loop, the apparatus comprising:

- at least one processor configured to process data, including frame data, associated with the data loop;

- at least one data loop input configured to receive data from the data loop;

- at least one data loop output configured to send data to the data loop;

- at least one controller configured to process at least a portion of the data from the at least one data loop input to generate at least one control signal indicative of whether the data from the at least one data loop input is to be routed to the at least one processor; and

- at least one multiplexer configured to route, in accordance with the at least one control signal, the data from the at least one data loop input to the at least one data loop output.

Claim 34. (Original) The apparatus of claim 33 wherein, in accordance with the at least one control signal, the at least one multiplexer routes to the at least one data loop output either the data from the data loop or data from the at least one processor.

Claim 35. (Original) The apparatus of claim 33 wherein the apparatus comprises a data storage system.

Appln No. 10/724,957
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Claim 36. (Original) The apparatus of claim 33 wherein the apparatus comprises a disk-based data storage system.

Claim 37. (New) The apparatus of claim 1, wherein the plurality of states comprises:
a first state where the current fill word is routed to the at least one device output and the data from the at least one fibre channel input is routed to the at least one fibre channel output;
a second state where the current fill word is routed to the at least one device output and the data from an arbitration generator is routed to the at least one fibre channel output; and
a third state where the data from the at least one fibre channel input is routed to the at least one device output and the data from the at least one device input is routed to the at least one fibre channel output.

Claim 38. (New) The apparatus of claim 1, wherein the second multiplexer routes data from the at least one fibre channel input to the at least one fibre channel output with delay less than three fibre channel words.

Claim 39. (New) The apparatus of claim 1, wherein the arbitration generator arbitrates fibre channel arbitrated loop access for the at least one disk.